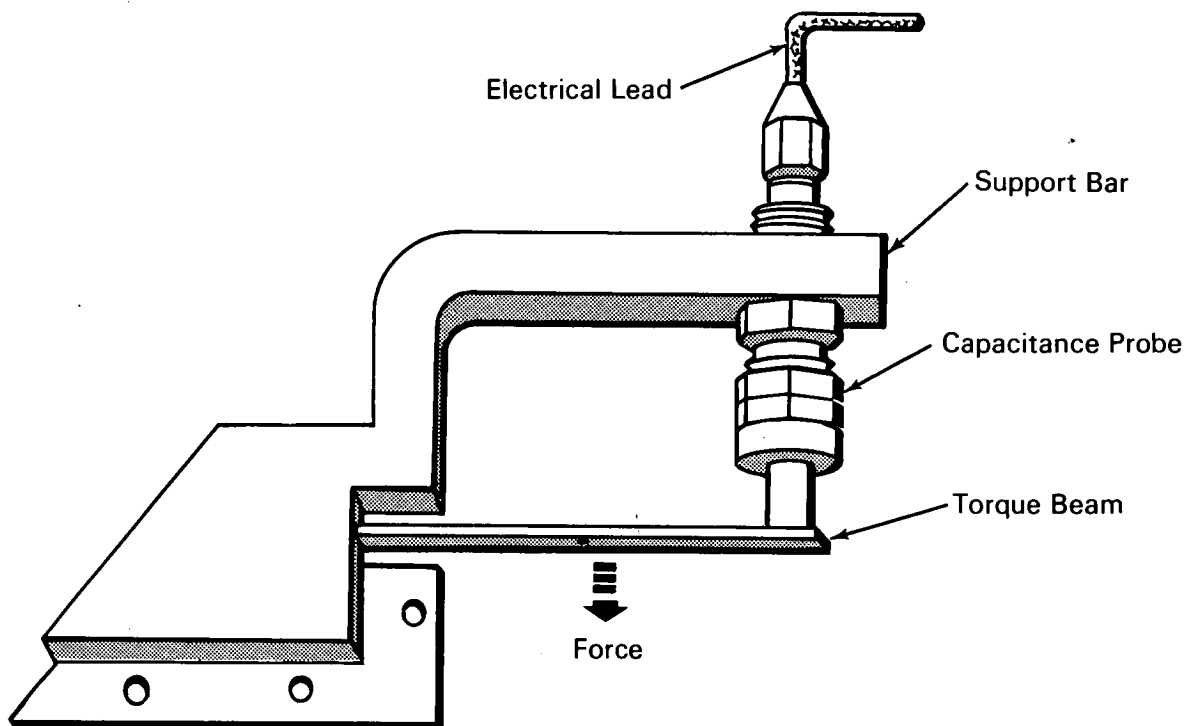


# NASA TECH BRIEF



NASA Tech Briefs are issued to summarize specific innovations derived from the U. S. space program and to encourage their commercial application. Copies are available to the public from the Clearinghouse for Federal Scientific and Technical Information, Springfield, Virginia 22151.

## Transducer Measures Force in Vacuum Environment



### The problem:

To measure force in a vacuum environment (down to  $10^{-9}$  mm Hg). Since radiation is the only mode of heat transfer in a vacuum, any transducer, such as a bonded or unbonded strain gage, that requires a sustained current for operation may overheat and fail in this environment. Bonded strain gages present the additional problem of outgassing at low pressures.

### The solution:

A force transducer assembly consisting of a standard capacitance probe and a torque beam.

### How it's done:

The capacitance probe is mounted between a support bar and a torque beam. The deflection at the end of the torque beam is directly proportional to the applied force. The resulting change in probe capac-

(continued overleaf)

itance is measured with a circuit employing a high-gain amplifier in a feedback loop with the probe. This circuit provides a voltage output that is directly proportional to the capacitor plate separation and hence to the applied force.

**Notes:**

1. This transducer can be used in high-pressure as well as in low-pressure environments for static and dynamic force measurements.

2. Inquiries concerning this invention may be directed to:

Technology Utilization Officer  
Lewis Research Center  
21000 Brookpark Road  
Cleveland, Ohio, 44135  
Reference: B66-10161

**Patent status:**

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C., 20546.

Source: Dean Carlton Glenn  
(Lewis-218)